DIL Engineering Task Group

Costs of Returned Concrete

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Why are we discussing returned concrete?

Returned Concrete
- 2%-10% of Production (avg 6%)

Growing problem - % returned is constant but increasing concrete volume produced

Has a direct impact on companies' revenue/profits
  - More operational efficiency to offset driver shortage and increasing material cost

Push for carbon neutrality - Increased interest for producers to understand impact on full process
  - Increasing regulations and environmental constraints

Lack of comprehensive tools available to quantify cost and footprint for handling returned concrete
As you can see, the tool analyzes the cost on two aspects: Material Cost and Handling Cost without going into more details:

Does not consider all the different options to handle returned concrete.

- Send directly to a disposal facility
- Produce blocks and sell
- Granulize via admix or mechanical crush and sell or reuse
- Reuse fresh concrete and batch on top
- Etc.
Engineering Task Group Objectives

➢ The primary objective of the task group was to:

☐ Evaluate the processes a concrete producer has available to address returned concrete

☐ Accurately quantify profit/loss for a given handling process

☐ Create a user-friendly electronic tool for producers to identify optimum management of returned concrete
Process Options

Reuse of Fresh Concrete (x)
- Xx
- xx

Returned Concrete

Produce Blocks & Sell (3)
- Capacity of forms
- Driver wage and time
- Time for discharge and truck washing
- Cost of hooks
- Time to uniform, stack, and load
- Profit for sell

Granulize via Admix & Sell / Reuse (4)
- Cost of admix
- Driver wage
- Time for mixing and dumping
- Time for truck washing
- Time for stockpiling
- Profit for sell / reuse

Breaking & Stock Piling (5)
- Driver wage and time for discharge
- Time for truck washing
- Load operator wage
- Time to break & stockpile

Mechanical Crush & Sell/Reuse (6)
- Equipment cost
- Operator wage
- Time for crushing
- Profit for sell / reuse

Haul Offsite (7)
- Load operator wage
- Time for loading
- Hauling & disposal fee

Dumping offsite (2)
- Driver wage
- Time for travel
- Fee for disposal
- Time for truck washing
General Information

1. General information

- What is the truck and driver hourly wage? [ ] $/hour
- What is the loader operators' wage? [ ] $/hour
- How much time does the driver take to wash his truck after dumping? [ ] mins/truck
- What is your average load size of returned concrete? [ ] yd³
- What is your yard equipment variable cost per hour? [ ] $/hr.
Dumping Offsite

Returned Concrete

Dumping offsite (2)
- Driver wage
- Time for travel
- Fee for disposal
- Time for truck washing

2. Dumping Offsite

- How much time driver takes to dump?
- What is the travel time to the site where concrete is dumped?
- If you pay per tonnage to dispose the concrete offsite, what is your rate?
- If you pay per number of trucks to dispose the concrete offsite, what is your rate?
- If you pay a monthly fee to dispose the concrete offsite, what is your fee?
- If you are paid for the returned concrete dumping, what is your rate?
# Block Production

## Returned Concrete

## Produce Blocks & Sell
- Capacity of forms
- Driver wage and time
- Time for discharge and truck washing
- Cost of hooks
- Time to unform, stack, and load
- Profit for sell

## 3. Block Production

<table>
<thead>
<tr>
<th>Question</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is your selling price?</td>
<td>$/block</td>
</tr>
<tr>
<td>What is the capacity of your forms?</td>
<td>yd$^3$/form</td>
</tr>
<tr>
<td>What is the cost for the hooks used?</td>
<td>$/block</td>
</tr>
<tr>
<td>How much time drivers take to fill the forms?</td>
<td>mins/form</td>
</tr>
<tr>
<td>How much time it takes to strip forms &amp; stack the blocks?</td>
<td>mins/form</td>
</tr>
<tr>
<td>How much time it takes to stack the blocks?</td>
<td>mins/block</td>
</tr>
<tr>
<td>How much time it takes to load the hauler?</td>
<td>mins/block</td>
</tr>
</tbody>
</table>
Granulize via Admix

Returned Concrete

Granulize via Admix & Sell / Reuse (4)
- Cost of admix
- Driver wage
- Time for mixing, dumping, washing
- Time for stockpiling
- Profit for sell / reuse

4. Granulize via admix

What is the cost of the admix? $/yd³
How much time it takes to add the admix, mix and dump? mins/yd³
How much of this material is your loader operator able to stockpile per hour? ton/hr.
If you reuse the granulized material, what is your cost of virgin aggregate? $/ton
If you sell the material, what is your selling price? $/ton
Break & Stockpile

Returned Concrete

Breaking & Stock Piling (5)
- Driver wage and time for discharge
- Time for truck washing
- Load operator wage
- Time to break & stockpile

5. Dumping onsite, breaking, and stockpiling

How much time does the driver take to dump the returned concrete? _____ mins/yd³

How many tons per hour is your loader operator able to break? _____ ton/hr.

How many tons per hour is your loader operator able to stockpile? _____ ton/hr.
Granulize Via Mechanical Crusher

Returned Concrete

Breaking & Stock Piling (5)
- Driver wage and time for discharge
- Time for truck washing
- Load operator wage
- Time to break & stockpile

Mechanical Crush & Sell/ Reuse (6)
- Equipment cost
- Operator wage
- Time for crushing
- Profit for sell /reuse

6. Granulize via mechanical crusher

If you rent a crusher, what is the total rental fee per hour? $/hour
If you rent a crusher, what is its capacity? tonnes/hr
If you have a crusher onsite, how many tonnes is your loader operator able fill the equipments' hopper per hour? tonnes/hr
If you have a crusher onsite, what is the equipment operators' wage? $/hour
If you have a crusher onsite, what is your crushers' variable cost per hour? $/hr
If you reuse the granulized material, what is your cost of virgin aggregate? $/ton
If you resell the material, what is your selling price? $/ton

* fee should include, equipment, labour to run crusher and loader and both equipments variable cost
Haul Offsite

- Returned Concrete

Breaking & Stock Piling (5)
- Driver wage and time for discharge
- Time for truck washing
- Load operator wage
- Time to break & stockpile

Haul Offsite (7)
- Load operator wage
- Time for loading
- Hauling & disposal fee

<table>
<thead>
<tr>
<th>7. Haul offsite</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you pay to haul the returned concrete per load, what is the price? $/load</td>
</tr>
<tr>
<td>How much time does the loader operator take to load the hauler? mins/truck</td>
</tr>
<tr>
<td>What is the average tons per truck hauled? ton/truck</td>
</tr>
<tr>
<td>If you pay to haul concrete by weight, how much do you pay per ton? $/ton</td>
</tr>
<tr>
<td>If you resell the material, what is your selling price? $/ton</td>
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Cost of Returned Concrete
Tool Demonstration

Cost of Returned Concrete
Questions

Any Suggestions?
Next Steps

➢ Receive feedback from Industry
➢ Add other processes and input fields
➢ Finalize tool